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SUBJECT: BRITISH COLUMBIA IS GLOBAL LEADER IN FUEL CELL TECHNOLOGY

1. Summary. British Columbia (BC) has the world's largest concentration of fuel cell and hydrogen technology research and expertise. CG and DPO recently visited Ballard Power Systems, a private company, as well as the National Research Council Canada Institute for Fuel Cell Innovation, and Fuel Cells Canada, the industry organization. These organizations have developed a hydrogen and fuel cell strategy that aims to solidify British Columbia's position in this sector, and that focuses efforts on development of a hydrogen highway by the 2010 Winter Olympic Games. End summary.

2. According to National Research Council Canada, roughly 88 percent of global research and development of fuel cell and hydrogen technology takes place in Canada; 72 percent in British Columbia and 16 percent in Ontario/Quebec. The United States accounts for 7 percent. In BC, this sector employs 1800 people at over 40 companies, and accounts for almost 2.5 billion dollars in investment, expenditures, and government funding. While the primary focus of research is on personal vehicles (there are five fuel cell powered Ford vehicles in use in Vancouver), companies are also developing technology for home heating and uninterruptible power systems.

3. Government and private sector efforts have crystallized around the concept of a hydrogen highway, linking Vancouver International Airport with Whistler, venue for most 2010 Olympic events. Hydrogen powered buses will run this route, fueling at strategically located refueling facilities. Passenger cars and delivery vehicles will incorporate Ballard fuel cell systems. Westport-Cummins engines in highway buses will be fueled with hythane from combined natural gas and hydrogen stations. Fuel cell forklifts will provide material handling support. Plans call for this hydrogen highway eventually to connect BC with California.

4. Ballard Power Systems, which considers itself a world leader in hydrogen fuel cell technology, is 30 percent owned by Ford/Daimler and accounts for 50 percent of the total hydrogen fuel cell industry in Canada. According to Ballard's VP, the US is its top contributor in government support and development spending for fuel cell technology as an alternative automotive energy source. Ballard also works closely with US Department of Energy in developing worldwide standards. And of the 150 fuel cell vehicles already on roadways around the globe, the US possesses 90 of them.

5. Hydrogen fuel cell vehicles run on hydrogen created from natural gas or wind energy and they produce no emissions. The challenges currently faced by this industry, however, include affordability, durability, and power density. Each car still costs about \$1 million dollars and the engines do not start at temperatures below 32 degrees Fahrenheit. Ballard asserts that these vehicles will be commercially viable by 2010. Ballard's VP would like to strengthen his company's already existing partnerships with the US and look to other US industries and the public sector to help reach Ballard's ultimate goal: to fully develop and market fuel cell automotive vehicles, both cars and buses, that will increase energy security and supply in North America, improve air quality and climate change conditions.

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